

September 1, 2005

Mr. Steve Trent Fluor Hanford Inc. 825 Jadwin Avenue Richland, WA 99352

Reference:

P.O. #630

Eberline Services R5-06-229-7291, SDQ H3232

Dear Mr. Trent:

Enclosed is the data report for two soil samples designated under SAF No. F05-023 received at Eberline Services on June 28, 2005. The samples were analyzed according to the accompanying chain-of-custody documents.

Please call if you have any questions concerning this report.

Sincerely,

Melissa C. Mannion

Senior Program Manager

Melissa Mamm

MCM/

Enclosure: Data Package

25262/47-25262/27-25262/47-25262/27-25262/47-25262/27-25262/27-25262/27-25262/27-25262/27-25262/27-25262/27-252



EDMC

Analytical Services
2030 Wright Avenue
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1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H3232 was composed of two soil samples designated under SAF No. F05-023 with a Project Designation of: 216-A-8 Crib Characterization Borehole.

The samples in SDG H3232 were analyzed in preparation batches with QC samples from SDG H3228 except for the gamma analyses.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Tritium Analysis

No problems were encountered during the course of the analyses.

2.2 Carbon-14 Analysis

The RPD between sample B1D7C7 and its duplicate analysis was 200%, greater than the 3σ limit of 33%. No other problems were encountered during the course of the analyses.

2.3 Total Strontium Analysis

No problems were encountered during the course of the analyses.

2.4 Technetium-99 Analysis

The Tc-99 samples were reanalyzed because of a LCS failure. No problems were encountered during the course of the reanalyses.

2.5 Iodine-129 Analysis

No problems were encountered during the course of the analyses.

2.6 Isotopic Uranium Analysis

No problems were encountered during the course of the analyses.

2.7 Total Uranium Analysis

No problems were encountered during the course of the analyses.

2.8 Americium-241 Analysis

No problems were encountered during the course of the analyses.

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2.9 Neptunium-237 Analysis

No problems were encountered during the course of the analyses.

2.10 Gamma Spectroscopy

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Melissa C. Mannion

Senior Program Manager

Date

EBERLINE SERVICES/RICHMOND SAMPLE DELIVERY GROUP H3232

SDG 7291 Contact Melissa C. Mannion Client Hanford
Contract No. 630
Case no SDG H3232

SUMMARY DATA SECTION

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N.J. Verville	
Prepared by	
Meliosa Manno	
Reviewed by	

SAMPLE DELIVERY GROUP H3232

SDG 7291
Contact Melissa C. Mannion

REPORT GUIDE

Client	<u>Hanford</u>	
Contract	No. 630	
Case no	SDG H3232	_

ABOUT THE DATA SUMMARY SECTION

The Data Summary Section of a Data Package has all data, in several useful orders, necessary for first level, routine review of the data package for a Sample Delivery Group (SDG). This section follows the Data Package Narrative, which has an overview of the data package and a discussion of special problems. It is followed by the Raw Data Section, which has full details.

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

The Sample and QC Summary Reports show all samples, including QC samples, reported in one SDG. These reports cross-reference client and lab sample identifiers.

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches (lab groupings reflecting how work was organized) relevant to the reported SDG with information necessary to check the completeness and consistency of the SDG.

WORK SUMMARY

The Work Summary Report shows all samples and work done on them relevant to the reported SDG.

METHOD BLANKS

The Method Blank Reports, one for each Method Blank relevant to the SDG, show all results and primary supporting information for the blanks.

LAB CONTROL SAMPLES

The Lab Control Sample Reports, one for each Lab Control Sample relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

REPORT GUIDES

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SAMPLE DELIVERY GROUP H3232

SDG 7291 Contact Melissa C. Mannion

GUIDE, cont.

Client	Hanford
Contract	No. 630
Case no	SDG_H3232

ABOUT THE DATA SUMMARY SECTION

DUPLICATES

The Duplicate Reports, one for each Duplicate and Original sample pair relevant to the SDG, show all results, differences and primary supporting information for these QC samples.

MATRIX SPIKES

The Matrix Spike Reports, one for each Spiked and Original sample pair relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

DATA SHEETS

The Data Sheet Reports, one for each client sample in the SDG, show all results and primary supporting information for these samples.

METHOD SUMMARIES

The Method Summary Reports, one for each test used in the SDG, show all results, QC and method performance data for one analyte on one or two pages. (A test is a short code for the method used to do certain work to the client's specification.)

REPORT GUIDES

The Report Guides, one for each of the above groups of reports, have documentation on how to read the associated reports.

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SAMPLE DELIVERY GROUP H3232

SDG 7291
Contact Melissa C. Mannion

LAB SAMPLE SUMMARY

Client <u>Hanford</u>
Contract <u>No. 630</u>
Case no <u>SDG H3232</u>

LAB SAMPLE ID	CLIENT SAMPLE ID	LOCATION	MATRIX L	evel sap no	CHAIN OF CUSTODY	COLLECTED
R506205-05	Lab Control Sample		SOLID	F05-023		
R506205-06	Method Blank		SOLID	F05-023		
R506205-08	Lab Control Sample		SOLID	F05-023		
R506205-09	Method Blank		SOLID	F05-023		
R506229-01	B1D7C7	216-A-8, I-2	SOLID	F05-023	F05-023-004	06/13/05 09:3
R506229-02	B1D7C8	216-A-8, I-2	SOLID	F05-023	F05-023-056	06/13/05 09:3
R506229-03	Lab Control Sample		SOLID	F05-023		
R506229~04	Method Blank		SOLID	F05~023		
R506229-05	Duplicate (R506229-01)	216-A-8, I-2	SOLID	F05-023		06/13/05 09:35
R506229-06	Duplicate (R506229-02)	216-A-8, I-2	SOLID	F05~023		06/13/05 09:39
R506229-07	Duplicate (R506229-01)	216-A-8, I-2	SOLID	F05-023		06/13/05 09:3

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 Lab id
 EBRINE

 Protocol
 Hanford

 Version
 Ver 1.0

 Porm
 DVD-LS

 Version
 3.06

 Report date
 09/01/05

SAMPLE DELIVERY GROUP H3232

SDG 7291 Contact Melissa C. Mannion

QC SUMMARY

Client Hanford

Contract No. 630

Case no SDG H3232

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	SOLIDS	SAMPLE AMOUNT	BASIS TWOUNT	DAYS S		LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7288		Method Blank	SOLID						R506205-06	7288-006
		Method Blank	SOLID						R506205-09	7288-009
		Lab Control Sample	SOLID						R506205-05	7288-005
		Lab Control Sample	SOLID						R506205-08	7298-008
7291	F05-023-004	B1D7C7	SOLID	94.5	138 g		06/28/05	15	R506229-01	7291-001
	F05-023-056	B1D7C8	SOLID	94.2	612 g		06/28/05	15	R506229-02	7291-002
		Method Blank	SOLID						R506229-04	7291-004
		Lab Control Sample	SOLID						R506229-03	7291-003
		Duplicate (R506229-01)	SOLID	94.5	138 g		06/28/05	15	R506229-05	7291-005
		Duplicate (R506229-01)	SOLID	94.2	138 g		06/28/05	15	R506229-07	7291-007
		Duplicate (R506229-02)	SOLID	94.2	612 g		06/28/05	15	R506229-06	7291-006

QC SUMMARY

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H3232

SDG 7291 Contact <u>Melissa C. Mannion</u>

PREP BATCH SUMMARY

Client Hanford
Contract No. 630
Case no SDG H3232

			PREPARATION ERROR				- PLANCHET	ZED —	- QUALI-	
TEST	MATRIX	MRTHOD	BATCH	2σ 🕏	CLIENT	MORE	RE BLAF	ik LCS	DUP/ORIG MS/ORIG	FIERS
Alpha	Spectroso	ору								
AM	SOLID	Americium 241 in Solids	7132-197	5.0	1			. 1	1/1	
PU	SOLID	Plutonium, Isotopic in Solids	7132-197	5.0	1]	. 1	1/1	
<u> </u>	SOLID	Uranium, Isotopic in Solids	7132-197	5.0	1		נ	1	1/1	_
Beta	Counting									
SR	SOLID	Total Strontium in Solids	7132-197	10.0	1				1/1	
TC	SOLID	Technetium 99 in Solids	7132-197	10.0	1			. 1	1/1	
Gamma	Spectros	сору								
GAM	SOLID	Gamma Scan	7132-1978	15.0	2	<u></u>	:	1	1/1	
I	SOLID	Todine 129 in Solids	7132-197	10.0	1		:	1	1/1	
Kinet	ic Phosph	orimetry (KPA)								
U_T	SOLID	Uranium, Total in Solids	7132-197	9.0	1		:	. 1	1/1	_
Liqui	d Scintil	lation Counting								
С	SOLID	Carbon 14 in Solids	7132-197	10.0	1		:	1	1/1	
н	SOLID	Tritium in Solids	7132-197	10.0	1		:	1 1	1/1	

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

PREP BATCH SUMMARY

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 Lab id EBRLNE

 Protocol Hanford

 Version Ver 1.0

 Form DVD-PBS

 Version 3.06

 Report date 09/01/05

SAMPLE DELIVERY GROUP H3232

SDG 7291
Contact Melissa C. Mannion

LAB WORK SUMMARY

Contract No. 630
Case no SDG H3232

LAB SAMPLE	CLIENT SAMPLE	m								
COLLECTED	LOCATION		MATRIX			SUF-	-			
RECEIVED	CUSTODY	SAF No		PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	MBTHOD
R506205-05	Lab Control Sa	umple		7288-005	MA		08/13/05	08/16/05	TWM	Americium 241 in Solids
			SCLID	7288-005	c		07/29/05	08/08/05	MWT	Carbon 14 in Solids
		F05-023		7288-005	H		07/30/05	08/04/05	MWT	Tritium in Solida
				7288-005	I		08/17/05	08/18/05	MWT	Iodine 129 in Solids
	•			7288-005	PU		08/03/05	08/04/05	MWT	Plutonium, Isotopic in Solids
				7288-005	SR		08/04/05	08/08/05	MWT	Total Strontium in Solids
				7288-005	U		07/30/05	08/01/05	MUT	Uranium, Isotopic in Solide
				7288-005	ਧ_ਧ		08/02/05	08/02/05	MWT	Uranium, Total in Solids
R506205-06	Method Blank			7288-006	МА		08/13/05	08/16/05	MWT	Americium 241 in Solids
			SOLID	7288-006	C		07/28/05	08/08/05	MWT	Carbon 14 in Solids
		F05-023		7288-006	н		07/29/05	08/04/05	MWT	Tritium in Solids
				7288-006	I		08/15/05	08/18/05	MWT	Iodine 129 in Solids
				7288-006	PU		08/02/05	08/04/05	MWT	Plutonium, Isotopic in Solids
				7288-006	SR		08/04/05	08/08/05	MWT	Total Strontium in Solids
				7288-006	U		07/30/05	08/01/05	MWT	Uranium, Isotopic in Solids
				7288-006	U_T		08/02/05	08/02/05	MWT	Uranium, Total in Solide
R506205-08	Lab Control Sa	umple		7288-008	TC		08/27/05	08/30/05	MWT	Technetium 99 in Solids
			SOLID							
-		F05-023	·							
R506205-09	Method Blank			7288-009	TC		08/27/05	08/30/05	MWT	Technetium 99 in Solids
			SOLID							
		F05-023								
R506229-01	B1D7C7			7291-001	C		07/29/05	08/19/05	MWT	Carbon 14 in Solids
06/13/05	216-A-8, I-2		SOLID	7291-001	GAM		08/05/05	08/23/05	MWT	Gamma Scan
06/28/05	F05-023-004	F05-023		7291-001	H		07/29/05	08/04/05	MVT	Tritium in Solids
				7291-001	I		08/16/05	08/18/05	Mot	Iodine 129 in Solids
				7291-001	TC	Al	08/27/05	08/30/05	MWT	Technetium 99 in Solids
R506229-02	B1D7C8			7291-002	MA		08/13/05	08/15/05	MWT	Americium 241 in Solids
06/13/05	216-A-8, I-2		SOLID	7291-002	MAD		08/16/05	08/23/05	MWT	Gamma Scan
06/28/05	F05-023-056	F05-023		7291-002	120		08/02/05	08/02/05	MWT	Plutonium, Isotopic in Solids
				7291-002	SR.		08/04/05	08/08/05	MWT	Total Strontium in Solids
				7291-002	υ		08/02/05	08/03/05	MWT	Uranium, Isotopic in Solids
				7291-002	O_T		08/02/05	08/02/05	MWT	Uranium, Total in Solids

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SAMPLE DELIVERY GROUP H3232

SDG <u>7291</u> Contact <u>Melissa C. Mannion</u>

WORK SUMMARY, cont.

Client Hanford
Contract No. 630
Case no SDG H3232

LAB SAMPLE	CLIENT SAMPLE ID									
COLLECTED	LOCATION CUSTODY S	AF No	MATRIX	PLANCHET	TEST	SUF- FIX	analyzed	RBAIRMED	BY	MRITEM
R506229-03	Lab Control Sampl	e		7291-003	GAM		08/11/05	08/23/05	MWT	Gamma Scan
	F	05-023	SOLID							
R506229-04	Method Blank		SOLID	7291-004	GAM		08/11/05	08/23/05	MWT	Gamma Scan
	F	05-023								_
R506229-05	Duplicate (R50622	9-01)		7291-005	С		07/29/05	08/19/05	WWI	Carbon 14 in Solids
06/13/05	216-A-8, I-2		SOLID	7291-005	H		07/29/05	08/04/05	MWT	Tritium in Solids
06/28/05	P	05-023		7291-005	1		08/17/05	08/18/05	MWT	Iodine 129 in Solids
R506229-06	Duplicate (R50622	9-02)		7291-006	AM		08/13/05	08/15/05	MWT	Americium 241 in Solids
06/13/05	216-A-8, I-2		SOLID	7291-006	GAM		08/11/05	08/23/05	MWT	Gamma Scan
06/28/05	F	05-023		7291-006	PU		08/02/05	08/02/05	MMI	Plutonium, Isotopic in Solids
				7291-006	SR		08/04/05	08/08/05	MWI	Total Strontium in Solids
				7291-006	Ū		08/01/05	08/03/05	MWI	Uranium, Isotopic in Solids
				7291-006	U_T		08/02/05	08/02/05	TWM	Uranium, Total in Solids
R506229-07	Duplicate (R50622	9-01)		7291-007	TC		08/27/05	08/30/05	MWT	Technetium 99 in Solids
06/13/05	216-A-8, I-2		SOLID							
06/28/05	F	05-023								
										

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 Lab id
 EBRINE

 Protocol
 Hanford

 Version
 Ver 1.0

 Form
 DVD-LWS

 Version
 3.06

 Report date
 09/01/05

SAMPLE DELIVERY GROUP H3232

SDG 7291 Contact Melissa C. Mannion

WORK SUMMARY, cont.

Client Hanford
Contract No. 630
Case no SDG H3232

TEST	SAF No	COUNTS OF	TESTS BY SAM	PLE TYPE CLIENT MORE	RE BLANK	rcs	DUP SPIKE	TOTAL
AM.	F05-023	Americium 241 in Solids	AMCMISO_IE_PLATE_AEA	1	1	1	1	4
C	F05-023	Carbon 14 in Solids	C14_COX_LSC	1	1	1	1	4
GAM	F05-023	Gamma Scan	Camma_GS	2	1	1	1	5
н	F05-023	Tritium in Solids	TRITIUM_COX_LSC	1	1	1	1	4
I	F05-023	Iodine 129 in Solids	I129_SEP_LEPS_GS	1	1	1	1	4
PÜ	F05-023	Plutonium, Isotopic in Solids	PUISO_PLATE_AEA	1	1	1	1	4
SR	F05-023	Total Strontium in Solids	SRTOT_SEP_PRECIP_GPC	1	1	1	1	4
TC	F05-023	Technetium 99 in Solids	TC99_TR_SEP_LSC	1	1	1	1	4
ט	F05-023	Uranium, Isotopic in Solids	UISO_PLATE_AEA	1	1	1	1	4
U_T	F05-023	Uranium, Total in Solids	UTOT_KPA	1	1	1	1	4
TOTALS				11	10	10	10	41

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Protocol Hanford
Version Ver 1.0
Form DVD-LWS
Version 3.06
Report date 99/01/05

EBERLINE SERVICES/RICHMOND SAMPLE DELIVERY GROUP H3232

7288-006

METHOD BLANK

Method Blank

SDG <u>7291</u> Contact <u>Meliss</u>	· · · · · · · · · · · · · · · · · · ·	se no <u>Hanford</u> tract <u>No. 630</u>	SDG_H3232
Lab sample id <u>R50620</u> Dept sample id <u>7288-0</u>	06 Material/M	le id <u>Method Blank</u> atrix AF No <u>F05-023</u>	SOLID

ANALYTE	CAS NO	r es ult pci/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	-0.298	1.8	3.0	400	Ū	H
Carbon 14	14762-75-5	-0.518	1.8	3.2	50	υ	C
Total Strontium	SR-RAD	-0.063	0.14	0.24	1.0	U	SR
Thorium 228	14274-82-9	N.A.			1.0		TH
Thorium 230	14269-63-7	N.A.			1.0		TH
Thorium 232	TH-232	N.A.			1.0		TH
Total Uranium (ug/g)	7440-61-1	0	0.054	0.13	1.0	ט	U_T
Uranium 233/234	U-233/234	0	0.046	0.18	1.0	υ	U
Uranium 235	15117-96-1	0	0.056	0.21	1.0	ט	ט
Uranium 238	U-238	0	0.046	0.18	1.0	U	บ
Neptunium 237	13994-20-2	N.A.			1.0		NP
Plutonium 238	13981-16-3	0.027	0.053	0.20	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.053	0.20	1.0	U	PU
Americium 241	14596-10-2	0.019	0.075	0.14	1.0	U	AM
Iodine 129	15046-84-1	0.536	0.62	1.4	2.0	U	I
Potassium 40	13966-00-2	N.A.					GAM
Cobalt 60	10198-40-0	N.A.			0.050		GAM
Antimony 125	14234-35-6	N.A.					GAM
Cesium 134	13967-70-9	N.A.					GAM
Cesium 137	10045-97-3	N.A.			0.10		GAM
Radium 226	13982-63-3	N.A.			0.10		GAM
Radium 228	15262-20-1	N.A.			0.20		GAM
Europium 152	14683-23-9	N.A.			0.10		GAM
Europium 154	15585-10-1	N.A.			0.10		GAM
Europium 155	14391-16-3	N.A.			0.10		GAM.
Thorium 228	14274-82-9	N.A.					GAM
Thorium 232	TH-232	N.A.					GAM
Uranium 235	15117-96-1	N.A.					GAM
Uranium 238	U-238	N.A.					GAM

216A8 Crib Characterization Borehole

METHOD BLANKS
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EBERLINE SERVICES/RICHMOND SAMPLE DELIVERY GROUP H3232

BLANK, cont.

7288-006

Method Blank

	7291 Melissa C. Mannion	Client/Case no Contract	SDG_H3232
Lab sample id Dept sample id		Client sample id Material/Matrix SAF No	 SOLID

analyte	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Americium 241	14596-10-2	N.A.			-		GAM

216A8 Crib Characterization Borehole

QC-BLANK	#53510		

METHOD BLANKS
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EBERLINE SERVICES / RICHMOND SAMPLE DELIVERY GROUP H3232

7288-009

METHOD BLANK

Method Blank

SDG 72 Contact Me	291 elissa C. Mannion	Client/Case no Contract	SDG_H3232
Lab sample id Ri Dept sample id 73		Client sample id Material/Matrix SAF No	 SOLID

ANALYTE	CAS NO	result pci/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	Quali- Fiers	TEST
Technetium 99	14133-76-7	0.150	0.23	0.54	15	υ	TC

216A8 Crib Characterization Borehole

QC-BLANK	54124	

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EBERLINE SERVICES / RICHMOND SAMPLE DELIVERY GROUP #3232

7291-004

METHOD BLANK

Method Blank

SDG <u>7291</u> Contact <u>Melissa C. Mannion</u>	Client/Case no Contract	 SDG_H3232
Lab sample id <u>R506229-04</u> Dept sample id <u>7291-004</u>	Client sample id Material/Matrix SAF No	 SOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	U	•	0.70		U	GAM
Cobalt 60	10198-40-0	U		0.072	0.050	បី	GAM
Antimony 125	14234-35-6	U		0.16		ט	GAM
Cesium 134	13967-70-9	U		0.080		ט	GAM
Cesium 137	10045-97-3	U		0.064	0.10	U	GAM
Radium 226	13982-63-3	ט		0.12	0.10	ប	GAM
Radium 228	15262-20-1	U		0.27	0.20	U	GAM
Europium 152	14683-23-9	U		0.19	0.10	U	GAM
Europium 154	15585-10-1	U		0.18	0.10	ט	GAM
Europium 155	14391-16-3	U		0.17	0.10	U	GAM
Thorium 228	14274-82-9	U		0.10		U	GAM
Thorium 232	TH-232	ប		0.27		Ü	GAM
Uranium 235	15117-96-1	υ		0.26		U	GAM
Uranium 238	U-238	υ		8.2		U	GAM
Americium 241	14596-10-2	σ		0.20		U	GAM

216A8 Crib Characterization Borehole

QC-BLANK	#53490
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METHOD BLANKS
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SAMPLE DELIVERY GROUP H3232

7288-005

LAB CONTROL SAMPLE

Lab Control Sample

SDG 7291 Contact Melissa C. Mannion	Client/Case no Hanford SDG H3232 Contract No. 630	_
Lab sample id <u>R506205-05</u> Dept sample id <u>7288-005</u>	Client sample id <u>Lab Control Sample</u> Material/Matrix <u>SOLID</u> SAF No <u>F05-023</u>	

ANALYTE	PCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2ø ERR pCi/g	REC	3 o LMTS (TOTAL)	PROTOCO: LIMITS
Tritium	680	15	5.4	400		н	720	29	94	84-116	80-120
Carbon 14	1570	32	6.7	50		c	1600	64	98	84-116	80-120
Total Strontium	11.3	0.65	0.28	1.0		SR	11.0	0.44	103	81-119	80-120
Thorium 230	N.A.			1.0		TH					80-120
Total Uranium (ug/g)	362	43	1.3	1.0		U_T	362	14	100	77-123	80-120
Uranium 233/234	20.3	2.2	0.93	1.0		ט	19.3	0.77	105	80-120	80-120
Dranium 235	14.8	1.8	0.23	1.0		ם	15.7	0.63	94	80-120	80-120
Uranium 238	20.5	2.2	0.90	1.0		U	21.0	0.84	98	82-118	80-120
Neptunium 237	n.A.			1.0		NP					80-120
Plutonium 238	23.3	2.2	0.19	1.0		ΡŲ	26.4	1.1	88	85-115	80-120
Plutonium 239/240	26.4	2.5	0.19	1.0		₽Ü	29.0	1.2	91	84-116	80-120
Americium 241	24.1	1.8	0.12	1.0		AM	22.4	0.90	108	84-116	80-120
Iodine 129	130	2.9	3.7	2.0		I	127	5.1	102	83-117	80-120
Cobalt 60	N.A.			0.050		GAM					80-120
Cesium 137	N.A.			0.10		GAM					80-120

216A8 Crib Characterization Borehole

QC-LCS #53	3509					
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 Lab id
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 Protocol
 Hanford

 Version
 Ver 1.0

 Form
 DVD-LCS

 Version
 3.06

 Report date
 09/01/05

SAMPLE DELIVERY GROUP H3232

7288-008

LAB CONTROL SAMPLE

Lab Control Sample

SDG	7291	Client/Case no	Hanford	5DG H3232
Contact	Melissa C. Mannion	Contract	No. 630	
Lab sample id	R506205-08	Client sample id	Lab Control Sample	
Dept sample id	7288-008	Material/Matrix		SOLID
		SAF No	F05-023	

ANALYTE	RESULT pCi/g	20 ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC	30 LMTS (TOTAL)	PROTOCOL LIMITS
Technetium 99	110	2.9	0.66	15		TC	109	4.4	101	83-117	80-120

216A8 Crib Characterization Borehole

QC-LCS	54123			

LAB CONTROL SAMPLES
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SAMPLE DELIVERY GROUP H3232

7291-003

LAB CONTROL SAMPLE

Lab Control Sample

SDG 7291 Contact Melissa C. Mannion	Client/Case no Hanford SDG H3232 Contract No. 630
Lab sample id <u>R506229-03</u> Dept sample id <u>7291-003</u>	Client sample id <u>Lab Control Sample</u> Material/Matrix

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	иоа pCi/g	bCT/d	QUALI- PIERS	TEST	ADDED pCi/g	2ø ERR pCi/g	REC	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Cobalt 60 Cesium 137	3.13 3,52	0.26	0.12	0.050		GAM GAM	3.75 3.88	0.15	83 91	78-1 22 77-123	80-120 80-120

216A8 Crib Characterization Borehole

QC-LCS #53489		

LAB CONTROL SAMPLES
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SAMPLE DELIVERY GROUP H3232

7291-005

DUPLICATE

B1D7C7

SDG <u>7291</u> Contact <u>Melissa C. Mannion</u>		Client/Case no Hanford SDG H3232 Contract No. 630
DUPLICATE	ORIGINAL	
Lab sample id <u>R506229-05</u>	Lab sample id <u>R506229-01</u>	Client sample id B1D7C7
Dept sample id 7291-005	Dept sample id <u>7291-001</u>	Location/Matrix 216-A-8, I-2 SOLID
	Received <u>06/28/05</u>	Collected/Weight 06/13/05 09:35 138 q
% solids <u>94.5</u>	% solids <u>94.5</u>	Custody/SAF No <u>F05-023-004</u> <u>F05-023</u>

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD	3ø PROT TOT LIMIT
Tritium	5.21	1.7	2.6	400		н	4.19	1.8	2.8		22	82
Carbon 14	0.096	1.6	2.7	50	υ	c	89.7	3.8	2.8		200	33
lodine 129	0.184	1.1	2.4	2.0	U	I	-0.316	1.4	3.1	U	-	·

216A8 Crib Characterization Borehole

	 -	
QC-DUP#1 53875		

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SAMPLE DELIVERY GROUP H3232

7291-007

DUPLICATE

B1D7C7

SDG 7291		Client/Case no Banford SDG H3232
Contact <u>Melissa C. Mannion</u>		Contract No. 630
DUPLICATE	ORIGINAL	
Lab sample id <u>R506229-07</u>	Lab sample id <u>R506229-01</u>	Client sample id B1D7C7
Dept sample id 7291-007	Dept sample id 7291-001	Location/Matrix 216-A-8, I-2 SOLID
	Received 06/28/05	Collected/Weight 06/13/05 09:35 138 q
* solids _94.2	* solids <u>94.5</u>	Custody/SAF No <u>F05-023-004</u> F05-023

ANALYTE	DUPLICATE pCi/g	20 ERR (COUNT)	MDA pCi/g	PDL pCi/g	QUALI- FIBRS	TEST	original pC1/g	20 ERR (COUNT)	MDA pCi/g	QUALI- RPD FIERS %	3σ PROT
Technetium 99	1.49	0.29	0.47	15		TC	1.08	0.41	0.47	31	63

216A8 Crib Characterization Borehole

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Version 3.06
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SAMPLE DELIVERY GROUP H3232

7291-006

DUPLICATE

B1D7C8

SDG <u>7291</u>	<u>_</u>	Client/Case no Hanford SDG H3232
Contact Melissa C. Mannion	_	Contract No. 630
DUPLICATE	ORIGINAL	
Lab sample id <u>R506229-06</u>	Lab sample id <u>R506229-02</u>	Client sample id B1D7C8
Dept sample id <u>7291-006</u>	Dept sample id <u>7291-002</u>	Location/Matrix 216-A-8, I-2 SOLID
	Received 06/28/05	Collected/Weight 06/13/05 09:35 612 q
% solids <u>94.2</u>	* solids 94.2	Custody/SAF No F05-023-056 F05-023

ANALYTE	DUPLICATE pCi/g	2 o ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	Test	ORI GINA L pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD	3 o TOT	
Total Strontium	45.8	1.7	0.38	1.0		SR	46.0	1.7	0.36		0	23	
Total Uranium (ug/g)	0.976	0.12	0.013	1.0		U_T	1.10	0.13	0.013		12	32	
Uranium 233/234	0.430	0.20	0.15	1.0		U	0.360	0.14	0.11		18	93	
Oranium 235	0.024	0.047	0.18	1.0	ס	Ū	0.034	0.034	0.13	U	-		
Oranium 238	0.469	0.20	0.15	1.0		ט	0.388	0.14	0.11		19	86	
Plutonium 238	0	0.028	0.11	1.0	τ	PU	o	0.029	0.11	đ	-		
Plutonium 239/240	0.070	0.056	0.11	1.0	U	PÜ	0.043	0.057	0.11	ס	-		
Americium 241	-0.028	0.055	0.11	1.0	U	AM	-0.014	0.056	0.11	υ	-		
Potassium 40	8.53	0.66	0.35			GAM	8.32	0.73	0.40		2	36	
Cobalt 60	ס		0.033	0.050	U	GAM	ប		0.038	ΰ	-		
Antimony 125	ט		1.9		Ū	MAD	σ		2.0	σ	-		
Cesium 134	ប		0.13		U	MAD	ט		0.13	Ŭ	-		
Cesium 137	1720	2.0	0.51	0.10		GAM	1610	2.0	0.53		7	32	
Radium 226	σ		0.71	0.10	Ū	GAM	U		0.74	Ū	-		
Radium 228	0.440	0.29	0.35	0.20		GAM	0.479	0.29	0.36		8	138	
Europium 152	τ		1.6	0.10	σ	GAM	Ü		1.6	U	-		
Europium 154	U		0.18	0.10	σ	GAM	σ		0.19	ט	-		
Europium 155	ד		1.2	0.10	ΰ	GAM	U		1.2	U	-		
Thorium 228	ט		0.75		υ	GAM	0.746	0.50	0.78	U	-		
Thorium 232	0.440	0.29	0.35			MAD	0.479	0.29	0.36		8	138	
Oranium 235	σ		1.7		ŭ	GAM	υ		1.7	ט	-		
Oranium 238	υ		9.2		σ	GAM	ਹ		9.6	U	-		
Americium 241	υ		1.8		U	GAM	Ū		1.9	Ù	_		

216A8 Crib Characterization Borehole

QC-DUP#2 53876

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Form DVD-DUP
Version 3.06
Report date 09/01/05

EBERLINE SERVICES / RICHMOND SAMPLE DELIVERY GROUP H3232

7291-001

DATA SHEET

BlD7C7

I '	7291 Melissa C. Mannion	Client/Case no Contract		SDG_H3232
		Client sample id Location/Matrix Collected/Weight Custody/SAF No	216-A-B, I-2 06/13/05 09:35 13	SOLID 8 q 023

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	4.19	1.8	2.8	400	_	H
Carbon 14	14762-75-5	89.7	3.8	2.8	50		С
Technetium 99	14133-76-7	1.08	0.41	0.47	15		TC
Iodine 129	15046-84-1	-0.316	1.4	3.1	2.0	U	I
Potassium 40	13966-00-2	U		1.7		U	GAM
Cobalt 60	10198-40-0	ט		0.088	0.050	U	GAM
Antimony 125	14234-35-6	ט		4.4		U	GAM
Cesium 134	13967-70-9	ט		0.16		U	GAM
Cesium 137	10045-97-3	3730	3.0	0.84	0.10		GAM
Radium 226	13982-63-3	U		1.4	0.10	U	GAM
Radium 228	15262-20-1	U		0.44	0.20	ט	GAM
Europium 152	14683-23-9	U		<u>3.8</u>	0.10	ט	GAM
Europium 154	15585-10-1	σ		0.29	0.10	U	GAM
Europium 155	14391-16-3	ט		1.6	0.10	ប	GAM
Thorium 228	14274-82-9	U		1.5		U	GAM
Thorium 232	TH-232	U		0.44		U	GAM
Uranium 235	15117-96-1	σ		2.9		Ū	GAM
Uranium 238	U-238	σ		12		U	GAM
Americium 241	14596-10-2	σ		0.74		υ	GAM

216A8 Crib Characterization Borehole

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Lab id <u>EBRLNE</u>

Protocol <u>Hanford</u>

Version <u>Ver 1.0</u>

Form <u>DVD-DS</u>

Version <u>3.06</u>

Report date <u>09/01/05</u>

EBERLINE SERVICES / RICHMOND SAMPLE DELIVERY GROUP H3232

7291-002

DATA SHEET

B1D7C8

	7291 Melissa C. Mannion	Client/Case no Contract		SDG_H3232
Lab sample id Dept sample id Received % solids	7291-002 06/28/05	Client sample id Location/Matrix Collected/Weight Custody/SAF No	216-A-8, I-2 06/13/05 09:35 6	SOLID 12 g -023

analyte	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIRRS	Test
Total Strontium	SR-RAD	46.0	1.7	0.36	1.0		SR
Total Uranium (ug/g)	7440-61-1	1.10	0.13	0.013	1.0		U_T
Uranium 233/234	U-233/234	0.360	0.14	0.11	1.0		"ט
Uranium 235	15117-96-1	0.034	0.034	0.13	1.0	U	U
Uranium 238	Ŭ-238	0.388	0.14	0.11	1.0		Ū
Plutonium 238	13981-16-3	0	0.029	0.11	1.0	ט	PU
Plutonium 239/240	PU-239/240	0.043	0.057	0.11	1.0	ט	PU
Americium 241	14596-10-2	-0.014	0.056	0.11	1.0	υ	AM
Potassium 40	13966-00-2	8.32	0.73	0.40			GAM
Cobalt 60	10198-40-0	U		0.038	0.050	ט	GAM
Antimony 125	14234-35-6	ט		2.0		ט	GAM
Cesium 134	13967-70-9	U		0.13		U	GAM
Cesium 137	10045-97-3	1610	2.0	0.53_	0.10		GAM
Radium 226	13982-63-3	U		D.74	0.10	ט	GAM
Radium 228	15262-20-1	0.479	0.29	0.36	0.20		GAM
Europium 152	14683-23-9	Ū		1.6	0.10	ט	GAM
Europium 154	15585-10-1	U		0.19	0.10	U	GAM
Europium 155	14391-16-3	U		_1.2	0.10	ซ	GAM
Thorium 228	14274-82-9	0.746	0.50	0.78		ש	GAM
Thorium 232	TH-232	0.479	0.29	0.36			GAM
Uranium 235	15117-96-1	Ü		1.7		U	GAM
Uranium 238	U-238	ប		9.6		ប	GAM
Americium 241	14596-10-2	υ		1.9		U	GAM

216A8 Crib Characterization Borehole

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SAMPLE DELIVERY GROUP H3232

Test AM Matrix SOLTD

SDG 7291

Contact Melissa C. Mannion

LAB METHOD SUMMARY

AMERICIUM 241 IN SOLIDS
ALPHA SPECTROSCOPY

Contract No. 630
Contract SDG H3232

RESULTS

LAB	RAW SUF-		Americium	•
BAMPLE ID	TEST FIX PLANCHET	CLIENT SAMPLE ID	241	
Preparation	n batch 7132-197			
R506205-05	7288-005	LCS (QC ID=53509)	ok	
R506205-06	7288-006	BLK (QC ID=53510)	υ	
R506229~02	7291-002	B1D7C8	บ	
R506229~06	7291-006	Duplicate (R506229-02)	– ਹ	

METHOD PERFORMANCE

MAR SAMPLE ID	ran Test		ent sample	ID	MDA pCi/c	ALIQ I 9	PREF	P DILU-	*	EFF *				PREPARED	ANAL-	DETECTOR
Preparation	batch	7132-19	7 2 <i>o</i> pr	ep error 5	.0 %	Reference	Lab	Noteboo	k 7132	pg.	197					
R506205-05		LCS	(QC ID=535	09)	0.12	0.500			67		243			08/13/05	08/13	SS-061
R506205-06		BLK	(OC ID=535	10)	0.14	0.500			59		244			08/13/05	08/13	SS-062
R506229-02		B1D	7C8		0.11	0.500			79		240		61	08/13/05	08/13	SS-065
R506229-06		Dup	Licate (R50 (QC ID=538		0.11	0.500			83		241		61	08/13/05	08/13	SS-066
Nominal val	ues an	d limits	from metho	d.	1.0	0.500			20-10	5	100	100	180			

PROCEDURES	REFERENCE	AMCMISO_IE_PLATE_AEA
	SPP-061	Determination of Moisture Content in Solid Samples
		rev 0
	SPP-071	Soil Dissolution, > 1.0g Aliquot, rev 5
	CP-963	Americium and Curium in Water and Dissolved
		Samples by Extraction Chromatography, rev 6
	CP-008	Heavy Element Electroplating, rev 9

AVERAGES ± 2 SD	MDA_	0.12	±	0.028
FOR 4 SAMPLES	AIETD -	72	Ì	22

METHOD SUMMARIES

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SAMPLE DELIVERY GROUP H3232

Test PU Matrix SOLID
SDG 7291
Contact Melissa C. Mannion

LAB METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS
ALPHA SPECTROSCOPY

Client	Hani	ford
Contract	No.	630
Contract	SDG	H3232

RESULTS

LAB SAMPLE ID	RAW SOF- TEST FIX	Planchet	CLIENT SAMPLE ID	Plutonium 238	Plutonium 239/240	
Preparation	1 batch 7132	-197				
R506205~05		7288-005	LCS (QC ID=53509)	ok	ok	
R506205-06		7288-006	BLK (QC ID=53510)	σ	ט	
R506229-02		7291-002	B1D7C8	υ	υ	
R506229-06		7291-006	Duplicate (R506229-02)	- v	- v	
	tues and lim			1.0	1.0	

METHOD PERFORMANCE

LAB SAMPLE ID	raw :	SUF- FIX CL	lent s	SAMPLE ID		MAX ME pCi/q	_	PREP	DILU-	*	EFF %		FWHM keV		PREPARED	ANAL- YZED	DETECTOR
Preparation	batch	7132-1	97	2ø prep	error	5.0 %	Reference	Lab	Notebool	c 7132	pg.	197					
R506205-05				ID=53509)	0.15	0.500			89		123			08/01/05	08/03	SS-059
R506205-06		BI	K (QC	ID=53510)	0.20	0.500			83		120			08/01/05	08/02	SS-036
R506229-02		B1	D7C8			0.11	L 0.500			95		203		50	08/01/05	08/02	88-035
R506229-06		Du	-	te (R5062		0.1	L 0.500			94		203		50	08/01/05	08/02	\$5-036
			(QC	ID=53491)	•											
Nominal val	പരമ മാ	d limit	s from	n method		1.0	0.500			20-10	5	10 0	100	 180		-	

PROCEDURES	REFERENCE	PUISO_PLATE_ARA
	SPP-071	Soil Dissolution, > 1.0g Aliquot, rev 5
	CP-941	Plutonium in Water and Dissolved Samples by
		Extraction Chromatography, rev 3
	CP-008	Heavy Element Electroplating, rev 9

AVERAGES ± 2 SD	MDA	0.15	±	0.098
FOR 4 SAMPLES	Alerd	90	±	11

MBTHOD SUMMARIES
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SAMPLE DELIVERY GROUP H3232

Test U Matrix SOLID

SDG 7291

Contact Melissa C, Mannion

LAB METHOD SUMMARY

URANIUM, ISOTOPIC IN SOLIDS
ALPHA SPECTROSCOPY

Client Hanford

Contract No. 630

Contract SDG H3232

RESULTS

LAB	RAW SUF-		1: Dranium	2: Uranium	3: Vranium	RESI	ILT RAT	rios	(%)
SAMPLE ID	TEST FIX PLANCH	T CLIENT SAMPLE ID	233/234	235	238	1+3	2σ	2+3	2σ
Preparation	n batch 7132-197					• • • • • • • • • • • • • • • • • • •			
R506205-05	7288-0)5 LCS (QC ID=53509)	ok	ok	ok				
R506205-06	7288-0	06 BLX (QC ID=53510)	σ	U	υ				
R506229-02	7291-0	22 B1D7C8	0.360	σ	0.388	93	49	9	9
R506229-06	7291-0	06 Duplicate (R506229-02)	ok	- U	ok	92	58	5	10
Nominal va	lues and limits fr	om method RDLs (pCi/g)	1.0	1.0	1.0	100		4	
216 A8 Crib	Characterization	Borehole				Averages 92		7	

METHOD PERFORMANCE

LAB SAMPLE ID	raw Test		CITEN	T SA	MPLE ID		MAX MI pCi/g	-	PREI	DILU-	¥IELD		COUNT min		DRIFT KeV		PREPARED	ANAL- YZED	DETECTOR
Preparation	batch	7132	2-197		2σ prep	error	5.0 %	Reference	Lab	Noteboo	k 7132	pg.	197						
R506205-05			LCS (QC I	D=53509)		0.93	0.500			89		120				07/29/05	07/30	SS-042
R506205-06			BLK (QC I	D=53510)		0.21	0.500			95		120				07/29/05	07/30	SS-031
R506229-02			B1D7C	8			0.13	0.500			91		203			50	07/29/05	08/02	SS-060
R506229-06			-		(R50622 D=53491)		0.18	0.500			101		130			49	07/29/05	08/01	SS-056
Nominal valu	ues an	d lir	mits f	ron	method		1.0	0.500			20-10	5	100	100		180			

	PROCEDURAS	REFERENCE	UISO PLATE AGA
	PROCEDURES	KEPERENCE	OTSO_MMITE_MEM
		SPP-061	Determination of Moisture Content in Solid Samples
			rev 0
		SPP-071	Soil Dissolution, > 1.0g Aliquot, rev 5
		CP-921	Uranium in Water and Dissolved Samples by
ĺ			Extraction Chromatography, rev 1
		CP-008	Heavy Element Electroplating, rev 9

AVERAGES ± 2 SD MDA 0.36 ± 0.76

FOR 4 SAMPLES YTELD 94 ± 11

METHOD SUMMARIES
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SAMPLE DELIVERY GROUP H3232

LAB METHOD SUMMARY

TOTAL STRONTIUM IN SOLIDS
BETA COUNTING

Contract No. 630
Contract SDS H3232

RESULTS

LAB	RAW SUF-		Total	
SAMPLE ID	TEST FIX PLANCEET	CLIENT SAMPLE ID	Strontium	
Preparation	n batch 7132-197			
R506205-05	7288-005	LCS (QC ID=53509)	ok	
R506205-06	7288-006	BLK (QC ID=53510)	σ	
R506229-02	7291-002	B1D7C8	46.0	
R506229-06	7291-006	Duplicate (R506229-02)	ok ·	

METHOD PERFORMANCE

SAMPLE ID	RAW S		ent sa	MPLE ID	MDA pCi/g	ALIQ g	PREP		YJELD *	EFF %				PREPARED	ANAL- YZED	DETECTOR
Preparation	batch	7132-197	7	2ø prep er	ror 10.0 %	Reference	Lab	Noteboo!	x 7132	pg.	197		-		•	
R506205-05		LCS	(QC I	D=53509)	0.28	1.00			84		100			08/04/05	08/04	GRB-230
R506205-06		BLK	(QC I	D=53510)	0.24	1.00			83		200			08/04/05	08/04	GRB-221
R506229-02		B1D7	7C8		0.36	1.00			94		<u>50</u>		52	08/04/05	08/04	GRB-217
R506229-06		Dupl		(R506229- D=53876)	02) 0.38	1.00			94		50		52	08/04/05	08/04	GRB-218
Nominal val	ues and	l limits	from	method	1.0	1.00	_		30-109	 -	100		180			

l	PROCEDURES	REFERENCE	SRTOT_SEP_FRECIP_GPC
١		SPP-061	Determination of Moisture Content in Solid Samples
			rev 0
		SPP-071	Soil Dissolution, > 1.0g Aliquet, rev 5
		CP-383	Strontium in Dissolved Solid of < 5.0g Aliquot,
l			rev 1
П			

AVERAGES ± 2 SD MDA 0.32 ± 0.13

FOR 4 SAMPLES YIELD 89 ± 12

METHOD SUMMARIES

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SUMMARY DATA SECTION

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Protocol Hanford
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 09/01/05

SAMPLE DELIVERY GROUP H3232

Test TC Matrix SOLID

SDG 7291

Contact Melissa C, Mannion

LAB METHOD SUMMARY

TECHNIETIUM 99 IN SOLIDS BETA COUNTING Client Hanford
Contract No. 630
Contract SDG H3232

RESULTS

LAB	RAW SUF-	•		Technetium	
SAMPLE ID	TEST FIX	PLANCHET	CLIENT SAMPLE ID	99	
reparation	batch 71	12-197			···
R506205-08		7288-008	LCS (QC ID=54123)	ok	
R506205-09	•	7288-009	BLK (QC ID=54124)	ΰ	
R506229-01	Al	7291-001	B1D7C7	1.08	
R506229-07		7291-007	Duplicate (R506229-01)	ck	

METHOD PERFORMANCE

SAMPLE ID	raw Test			n s	AMPLE ID		MDA pCi/g	a g	PREF		# AIRID		COUNT min	PWHM keV		PREPARED	ANAL- YZED	DETECTOR
Preparation	batch	713	2-1 9 7		2σ prep	error	10.0 %	Reference	Lab	Noteboo	k 7132	pġ.	197					
R506205-08			LCS	QC	ID=54123)		0.66	1.00			97		50			08/24/05	09/27	GRB-226
R506205-09			BLK	QC	ID=54124)		0.54	1.00			98		50			08/24/05	08/27	GRB~227
R506229-01		Al	B1D70	:7			0.47	1.16			96		50		75	08/24/05	08/27	GRB-221
R506229-07			-		e (R50622 ID=5 41 26)	901)	0.47	1.15			97		50		75	08/24/05	08/27	GRB-221
Nominal valu	ues aı	nd li	mits i	ron	method		15	1.00	····	_	20-10	5	50	,	180			

PROCEDURES	REFERENCE	TC99_TR_SEP_LSC
	SPP-071	Soil Dissolution, > 1.0g Aliquot, rev 5
	CP-431	Technetium-99 Purification of Soil or Resin by
[Extraction Chromatography, rev 2
	CP-008	Heavy Element Electroplating, rev 9
Į.		

AVERAGES ± 2 SD MDA 0.54 ± 0.18
FOR 4 SAMPLES YIELD 97 ± 2

METHOD SUMMARIES

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H3232

Test GAM Matrix SOLID

SDG 7291

Contact Melissa C. Mannion

LAB METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Client Hanford

Contract No. 630

Contract SDG H3232

RESULTS

Preparation batc	h 7132-197B			
R506229-01	7291-001	B1D7C7	ΰ	3730
R506229-02	7291-002	B1D7C8	σ	1610
R506229-03	7291-003	LCS (QC ID=53489)	ok	ok
R506229-04	7291-004	BLK (QC ID=53490)	U	U
R506229-06	7291-006	Duplicate (R506229-02)	- U	ok

METHOD PERFORMANCE

T.AB	RAW SUF-			MDA	ALIO	PRBP	DYLU-	AIETD	eff	COUNT	FWHM	DRIFT	DAYS		ANAL-	
SAMPLE ID	TRST FIX (libny s	AMPLE ID	pC1/g	g	FAC	TION	ŧ	ŧ	min	keV	KeV	HELLD	PREPARED	YZED	DETECTOR
Preparation	batch 7132-	-197B	2a prep error	15.0 % R	eference	Lab I	Not eb oo)	t 7132	pg.	197						
R506229-01	E	31D7C7		7.9	57.8					858			53	07/23/05	08/05	PD,07,00
R506229-02	I	31D7C8		4.5	216					400			- 64	07/23/05	08/16	JR,05,00
R506229-03	I	ics (QC	ID=53489)	0.12	57.0					479				07/23/05	08/11	JR,03,00
R506229-04	I	SLK (QC	ID=53490)	0.51	57.0					479				07/23/05	08/11	JR,04,00
R506229-06	I	Duplicat	e (R506229-02)	4.2	216					467			59	07/23/05	08/11	JR,05,00
Nominal val	ues and limi	lts from	method	0.050	16.0					100			180			

PROCEDURES	REFERENCE	GAMMA_GS
	SPP-061	Determination of Moisture Content in Solid Samples
		rev 0
	SPP-100	Ge(Li) Preparation for Commercial Samples, rev 7

AVERAGES ± 2 SD	MDA 3.4 ± 6.4
FOR 5 SAMPLES	AIETD #

METHOD SUMMARIES

Page 6

SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H3232

Test I Matrix SOLID
SDG 7291
Contact Melissa C. Mannion

LAB METHOD SUMMARY

IODINE 129 IN SOLIDS
GAMMA SPECTROSCOPY

Client	Hanford	
Contract	No. 630	
Contract	SDG H3232	

RESULTS

LAB RAW SUF-SAMPLE ID TEST FIX PLANCHET

PLANCHET CLIENT SAMPLE ID

Iodine 129

Preparation batch 7132-197

R506205-05 7288-005 R506205-06 7288-006

7288-006 BLK (QC ID=53510)

7291-001 B1D7C7

LCS (QC ID=53509)

0

R506229-01 R506229-05

7291-005

Duplicate (R506229-01)

- 0

ok

Ū

Nominal values and limits from method 216A8 Crib Characterization Borehole RDLe (pCi/g)

2.0

METHOD PERFORMANCE

LAB SAMPLE ID	RAW SUF-		MDA pCi/g	ALIQ 9	PREP FAC	DILU- TION	# YIBLD	BFF %				PREPARED	ANAL-	DETECTOR
Preparation	batch 713	32-197 2¢ prep	error 10.0 % R	eference	Lab:	Noteboo!	k 7132	pg.	197					_
R506205-05		LCS (QC ID=53509)	3.7	1.00			56		326			08/12/05	08/17	XSPEC-016
R506205-06		BLK (QC ID=53510)	1.4	1.00			43		625			08/12/05	08/15	XSPEC-002
R506229-01		B1D7C7	3.1	1.00			38		771		64	08/12/05	08/16	XSPEC-016
R506229-05		Duplicate (R50622 (QC ID=53875)	_	1.00			25		1003		65	08/12/05	08/17	KSPEC-002
Nominal val	ues and 1:	mits from method	2.0	1.00			20-10	5	300	 	180			

PROCEDURES	REFERENCE	I129_SEP_LEPS_GS
	SPP-062	Sample Aliquoting, rev 0
	CP-024	Iodine-129, Sample Dissolution, rev 5
	CP-530	Iodine-129 Purification, rev 1

AVERAGES ± 2 SD MDA 2.6 ± 2.0

FOR 4 SAMPLES YIELD 40 ± 26

METHOD SUMMARIES

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H3232

Test	U T Matrix SOLID
SDG	7291 .
Contact	Melissa C. Mannion

LAB METHOD SUMMARY

URANIUM, TOTAL IN SOLIDS
KINETIC PHOSPHORIMETRY (KPA)

Client	Hanford
Contract	No. 630
Contract	SDG_H3232

RESULTS

	SUF- FIX PLANCHET	CLIENT SAMPLE ID	Total Uranium	
Preparation bate	th 7132-197			
R506205-05	7288-005	LCS (QC ID=53509)	ok	
R506205-06	7288-006	BLK (QC ID=53510)	σ	
R506229-02	7291-002	B1D7C8	1.10	
R506229-06	7291-006	Duplicate (R506229-02)	ok	

METHOD PERFORMANCE

SAMPLE ID	ran s Test i	OUF- PIX CLIEST SAMPLE ID	MDA ug/g	Q ILIA P	PREP	DILU- TION	# AIRITD	EFF %				PREPARED	ANAL	DETECTOR
Preparation	batch	7132-197 20 prep error 9.0) t	Reference	Lab :	Noteboo)	r 7132	pg.	197					
R506205-05		LCS (QC ID=53509)	1.3	0.0050								08/02/05	08/02	KPA-001
R506205-06		BLK (QC ID=53510)	0.13	0.0050								08/02/05	08/02	KPA-001
R506229-02		B1D7C8	0.013	0.0500							50	08/02/05	08/02	KPA-001
R506229-06		Duplicate (R506229-02)	0.013	0.0500							50	08/02/05	08/02	KPA-001
		(QC ID=53876)												
Nominal val	ues and	l limits from method	1.0	0.0050							180			

PROCEDURES	REFERENCE	UTOT_KPA
	CP-929	Calibration of the Kinetic Phosphorimeter, rev 9
	SPP-071	Soil Dissolution, > 1.0g Aliquot, rev 5
	CP-928	Total Dranium by Kinetic Phosphorimetry, rev 8

AVERAGES ± 2 SD MDA 0.36 ± 1.3

FOR 4 SAMPLES YIELD _____ ± ____

METHOD SUMMARIES

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SUMMARY DATA SECTION

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Protocol Manford
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 09/01/05

SAMPLE DELIVERY GROUP H3232

Test	<u>c</u>	Matri	ж	SOLID	
SDG	<u>7291</u>				
Contact	Melia	ssa C.	М	annion	

LAB METHOD SUMMARY

CARBON 14 IN SOLIDS

LIQUID SCINTILLATION COUNTING

Client	Hanford				
Contract	No. 630				
Contract	SDG H3232				

RESULTS

RAW SUF-LAB SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Carbon 14 Preparation batch 7132-197 LCS (QC ID=53509) RS06205-05 7288-005 ok R506205-06 7288-006 BLK (QC ID=53510) U R506229-01 7291-001 B1D7C7 89.7 R506229-05 7291-005 Duplicate (R505229-01) OUT U Nominal values and limits from method RDLs (pCi/g) 50 216A8 Crib Characterization Borehole

METHOD PERFORMANCE

TAB SAMPLE ID	RAN :		T.TEM	r Ei	AMPLE ID		MDA pCi/s	-	PRES	DILU-	ALEID	EFF		FWHM keV			PREPARED	ANAL-	DETECTOR
	12.51						pci/;						- DILLI			пеле	PREPARED	12,60	DEIECIUR
Preparation	batch	7132-	197		2σ prep	error	10.0 %	Reference	Lab	Notebool	7132	pg.	197						
R506205-05		L	Cs (2C 1	ID=53509)	6.7	0.400			100		11				07/28/05	07/29	LSC-005
R506205-06		В	LK (QC 1	ID=53510)	3.2	0.400			100		50				07/28/05	07/28	L3C-005
R506229-01		В	1D7C	7			2.8	0.434			100		50			46	07/28/05	07/29	LSC-005
R506229-05		D	upli	cate	e (R5062	29-01)	2.7	0.449			100		50			46	07/28/05	07/29	LSC-005
			(4	GC 1	ID=53875	.)				_	_								
Nominal valu	ues and	d limi	ts f	com	method		50	0.400					25		7	180			

PROCEDURES	REFERENCE	C14_COX_LSC
	CP-251	Tritium/Carbon-14 Oxidation, rev 8

AVERAGES ± 2 SD MDA 3.8 ± 3.8

FOR 4 SAMPLES YIELD 100 ± 0

METHOD SUMMARIES

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H3232

Test H Matrix SOLID

SDG 7291

Contact Melissa C. Mannion

LAB METHOD SUMMARY

TRITIUM IN SOLIDS
LIQUID SCINTILLATION COUNTING

Client	Hanford
Contract	No. 630
Contract	SDG H3232

RESULTS

SAMPLE ID TEST	-	CLIENT SAMPLE ID	Tritium		
Preparation batch	7132-197				
R506205-05	7288-005	LCS (QC ID=53509)	ok		
R506205-06	7288-006	BLK (QC ID=53510)	ט		
R506229-01	7291-001	B1D7C7	4.19		
	7291-005	Duplicate (R506229-01)	ok		

METHOD PERFORMANCE

216A8 Crib Characterization Borehole

SAMPLE ID	RAN S	SUF- FIX CLIEN	T SAMPLE	S IID	MDA pC1/s		PREP FAC		# Aleid			FWHM keV		PREPARED	ANAL-	DETECTOR
Preparation	batch	7132-197	2σ p	rep error	10.0 %	Reference	Lab	Notebool	7132	pg.	197		,		<u> </u>	
R506205-05		LCS	(QC ID=53	1509)	5.4	0.400			100		37			07/28/05	07/30	LSC-004
R506205-06		BLK	(QC TD-53	1510)	3.0	0.400			100		120			07/28/05	07/29	LSC-004
R506229-01		B1D70	27		2.8	0.434			100		120		46	07/28/05	07/29	LSC-004
R506229-05		•	icate (RS (QC ID=53	506229-01} 8875)	2.6	0.449			100		120		46	07/28/05	07/29	LSC-004
Nominal val	ues and	d limits f	irom meth	nod	400	0.400					25		 180			

PROCEDURES	REFERENCE	TRITIUM_COX_LSC
	CP-251	Tritium/Carbon-14 Oxidation, rav 8

AVERAGES ± 2 SD	MDA3.	4_ ± 2.6
FOR 4 SAMPLES	YIELD 100	<u> </u>

METHOD SUMMARIES
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SUMMARY DATA SECTION
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SAMPLE DELIVERY GROUP H3232

SDG <u>7291</u> Contact <u>Melissa C. Mannio</u>n

REPORT GUIDE

Client	<u>Hanford</u>
Contract	No. 630
Case no	SDG_H3232

SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

- * LAB SAMPLE ID is the lab's primary identification for a sample.
- * DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.
- * CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.
- * QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.
 - QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.
- * All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

REPORT CUIDES

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H3232

SDG <u>7291</u> Contact <u>Melissa C. Mannion</u>

REPORT GUIDE

Client	Hanford
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Case no	SDG_H3232

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

- * The preparation batches are shown in the same order as the Method Summary Reports are printed.
- * Only analyses of planchets relevant to the SDG are included.
- * Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
- * The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

These qualifiers should be reviewed as follows:

- X Some data has been manually entered or modified. Transcription errors are possible.
- P One or more results are 'preliminary'. The data is not ready for final reporting.
- 2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 09/01/05

SAMPLE DELIVERY GROUP H3232

SDG 7291 Contact Melissa C. Mannion

REPORT GUIDE

Client	<u>Hanford</u>	
Contract	No. 630	
Case no	SDG_H3232	

WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

- * TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.
- * SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.
- * The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.
- * PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.
- * For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.
- * The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

REPORT GUIDES

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H3232

SDG 7291
Contact Melissa C. Mannion

REPORT GUIDE

Client <u>Hanford</u>
Contract <u>No. 630</u>
Case no <u>SDG H3232</u>

DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

- * TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.
- * The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

- * ERRORS can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.
- * A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.
- * When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

U The RESULT is less than the MDA (Minimum Detectable Activity).

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SUMMARY DATA SECTION
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SAMPLE DELI	VERY GR	OUP H	323	2
-------------	---------	-------	-----	---

SDG 7291 Contact Melissa C. Mannion

GUIDE, cont.

Client	Hanford
Contract	No. 630
Case no	SDG_H3232

DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

- J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.
- B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

- L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.
- H Similar to 'L' except the recovery was high.
- P The RESULT is 'preliminary'.
- X Some data necessary to compute the RESULT, BRROR or MDA was manually entered or modified.
- 2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

* An MDA is underlined if it is bigger than its RDL.

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SUMMARY DATA SECTION
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SAMPLE DELIVERY GROUP H3232

SDG <u>7291</u>
Contact <u>Melissa C. Mannion</u>

GUIDE, cont.

Client	Hani	ford
Contract	No.	630
Case no	SDG	H3232

DATA SHEET

- * An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.
- * A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.
- * When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

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ZAMPT.R	DELIVERY	GROTTP	#3232
	TAPHTAPET	GROUP	B3232

SDG 7291 Contact Melissa C. Mannion

REPORT GUIDE

Client	Hanford
Contract	No. 630
Case no	SDG_H3232

LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

- * All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.
- * An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- * REC (Recovery) is RESULT divided by ADDED expressed as a percent.
- * The first, computed limits for the recovery reflect:
 - The error of RESULT, including that introduced by rounding the result prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

- 2. The error of ADDED.
- 3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- * The second limits are protocol defined upper and lower QC limits for the recovery.
- * The recovery is underlined if it is outside either of these ranges.

REPORT GUIDES
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SAMPLE DELIVERY GROUP E3232

SDG 7291 Contact Melissa C. Mannion

REPORT GUIDE

Client	Hanford	
Contract	No. 630	
Case no	SDG_H3232	

DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTs divided by their average expressed as a percent.

If both RESULTs are less than their MDAs, no RPD is computed and a '-' is printed.

For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTs prior to printing.

If this limit is labeled TOT, it includes the preparation error in the RESULTs. If labeled CNT, it does not.

This value reported for this limit is at most 999.

- * The second limit for the RPD is the larger of:
 - 1. A fixed percentage specified in the protocol.

REPORT GUIDES
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SAMPLE DELIVERY GROUP H3232

SDG <u>7291</u> Contact <u>Melissa C. Mannion</u>

GUIDE, cont.

Client	Hanford
Contract	No. 630
Case no	SDG_H3232

DUPLICATE

- A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.
- * The RPD is underlined if it is greater than either limit.
- * If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

REPORT GUIDES
Page 9
SUMMARY DATA SECTION
Page 39

RAMPLE	DKLIVERY	GROUP	H3232
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SDG <u>7291</u> Contact <u>Melissa C. Mannion</u>

REPORT GUIDE

Client	<u>Hanford</u>
Contract	No. 630
Case no	SDG_H3232

MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- * REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.
- * The first, computed limits for the recovery reflect:
 - The errors of the two RESULTs, including those introduced by rounding them prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

- 2. The error of ADDED.
- 3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- * The second limits are protocol defined upper and lower QC limits

REPORT GUIDES
Page 10
SUMMARY DATA SECTION
Page 40

SAMPLE DELIVERY GROUP H3232

SDG 7291______Contact Melissa C. Mannion

GUIDE, cont.

Client	Hanford
Contract	No. 630
Case no	SDG_H3232

MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

* The recovery is underlined (out of spec) if it is outside either of these ranges.

REPORT GUIDES
Page 11
SUMMARY DATA SECTION
Page 41

SAMPLE DELIVERY GROUP H3232

SDG 7291
Contact Melissa C. Mannion

REPORT GUIDE

Client	Hani	ford	
Contract	No.	630	
Case no	SDG	H3232	

METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

The J and X flags are as on the data sheet.

- * Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.
- * Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

REPORT GUIDES
Page 12
SUMMARY DATA SECTION
Page 42

SAMPLE DELIVERY GROUP H3232

SDG 7291 Contact Melissa C. Mannion

GUIDE, cont.

Client	Hanford
Contract	No. 630
Case no	SDG_H3232

METHOD SUMMARY

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

- * Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.
- * If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

MDAs are underlined if greater than the printed RDL.

- * Aliquots are underlined if less than the nominal value specified for the method.
- * Prepareation factors are underlined if greater than the nominal value specified for the method.
- * Dilution factors are underlined if greater than the nominal value specified for the method.
- * Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.
- * Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.
- * Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

REPORT GUIDES
Page 13
SUMMARY DATA SECTION
Page 43

SAMPLE DELIVERY GROUP H3232

SDG 7291
Contact Melissa C. Mannion

GUIDE, cont.

Client	Hanfo	ord
Contract	No. 6	30
Case no	SDG F	13232

METHOD SUMMARY

- * Count times are underlined if less than the nominal value specified for the method.
- * Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.
- * Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.
- * Days Held are underlined if greater than the holding time specified in the protocol.
- * Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1+3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

REPORT GUIDES
Page 14
SUMMARY DATA SECTION
Page 44

SAMPLE DELIVERY GROUP #3232

SDG 7291 Contact Melissa C. Mannion

GUIDE, cont.

Client	<u> Hanford</u>				
Contract	No. 630				
Case no	SDG_H3232				

METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

Page 15
SUMMARY DATA SECTION
Page 45

	Fluor	Hanford Inc.	,	CHAIN	OF CUSTOD	Y/SAMPLE	ANALYSIS F	REQUEST	JEST F05-023-004			PAGE 1	OF 1
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RICHMOND, CA LABORATORY

SAMPLE RECEIPT CHECKLIST

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Form SCP-01.2, 01-23-04

"over 55 years of quality nuclear services"

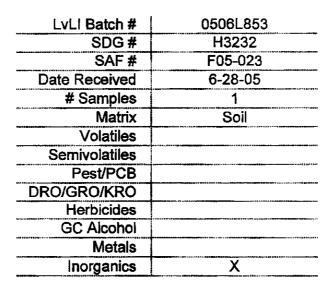


Mr. Steve Trent Fluor Hanford Inc. 825 Jadwin Ave. Richland, WA 99352

Subject: Contract No. 630
Analytical Data Package

Dear Mr. Trent:





The electronic data deliverable (EDD) will be emailed shortly. If you have any questions, please don't hesitate to contact me at (610) 280-3012.

Sincerely,

Lionville Laboratory Incorporated

Örlette S. Johnson Project Manager

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Lionville Laboratory, Inc. INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD F05-023 H3232

DATE RECEIVED: 06/28/05 LVL LOT # :0506L853 CLIENT ID /ANALYSIS LVL # MIX PREP # COLLECTION EXTR/PREP ANALYSIS B1D7C7
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Analytical Report

Client: TNU-HANFORD F05-023 H3232

W.O.#: 11343-606-001-9999-00

LVL#: 0506L853

Date Received: 06-28-05

INORGANIC NARRATIVE

1. This narrative covers the analyses of 1 soil sample.

The sample was prepared and analyzed in accordance with the methods indicated on the attached 2. glossary.

LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state For a complete list of accrediting authorities and the corresponding accreditations. analytes/methods, please contact your Project Manager.

- Sample holding times as required by the method and/or contract were met with the exception of 3. Total Organic Carbon (TOC) and Total Inorganic Carbon (TIC).
- The results presented in this report are derived from samples that met LvLI's sample acceptance 4. policy.
- 5. The method blanks were within the method criteria.
- The Laboratory Control Samples (LCS) were within the laboratory control limits. 6.
- The matrix spike recoveries for Chromium VI, Nitrate Nitrite and TOC were within the 75-125% 7. control limits.
- The replicate analyses for Percent Solids, Chromium VI, Nitrate Nitrite and Oil and Grease were 8. within the 20% Relative Percent Difference (RPD) control limit however replicate analyses for TOC and TIC were outside the control limit that may be attributed to sample inhomogeneity.
- 9. Results for solid samples are reported on a dry weight basis with the exception of TOC and TIC that are dried prior to analysis.
- 10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Lionville Laboratory Incorporated

njp\i06- 853

9/21/08

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 11 pages.

Lionville Laboratory Incorporated

WET CHEMISTRY

METHODS GLOSSARY FOR SOIL/SOLIDS SAMPLE ANALYSIS

	<u>ASTM</u>	SW846	<u>OTHER</u>
% Ash	D2216-80		
% Moisture	D2216-80		ILMO4.0 (e)
% Solids	D2216-80		ILMO4.0 (e)
% Volatile Solids	D2216-80		
ASTM Extraction in Water	D3987-81/85		
BTU	D240-87		
CEC		9081	c
Chromium VI		√3060A/7196A	_
Corrosivity by coupon by pH		1110(mod) 9045C	
Cyanide, Total		9010B	ILMO4.0 (e)
Cyanide, Reactive		Section 7.3/9014	
Halides, Extractable Organic		9020B	EPA 600/4/84-008
Halides, Total		9020B	EPA 600/4/84-008
EP Toxicity		1310A	
Flash Point		1010	
Ignitability		1010	1110001
Oil & Grease		79071A (mad.)	y 413.1 (mod.)
Carbon, Total Organic and Inorg	pnic	9060	√ 413.1 (mod.) Lloyd Kahn (mod)/
Oxygen Bomb Prep for Anions	D240-87(mod)	5050	1415.1
Petroleum Hydrocarbons, Total Rec	coverable	9071	EPA 418.1
pH, Soil		9045C	
Sulfide, Reactive		Section 7.3/9030B	
Sulfide		9030B(mod)	
Specific Gravity	D1429-76C/	D5057-90	
Sulfur, Total		9056	
Synthetic Preparation Leach		1312	
Paint Filter		9095A	
Other: Nitrate Nitrate	Method: ¿	-PA 353. 2 (mod.	
Other:	Method		

Lionville Laboratory Incorporated

METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

- U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- * = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

MB = Method or Preparation Blank.

MS = Matrix Spike.

MSD = Matrix Spike Duplicate.

REP = Sample Replicate

LC = Laboratory Control Sample.

NC = Not calculated.

A suffix of -R, -S, or -T following these codes indicate a replicate, spike or sample duplicate analysis respectively.

ANALYTICAL WET CHEMISTRY METHODS

- ASTM Standard Methods.
- USEPA Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020).
- 3. Test Methods for Evaluating Solid Waste (USEPA SW-846).
- a. Standard Methods for the Examination of Water and Waste, 16 ed, (1983).
- b. Standard Methods for the Examination of Water and Waste, 17 ed, (1989)/18ed (1992).
- c. Method of Soil Analysis, Part 1, Physical and Mineralogical Methods, 2nd ed, (1986).
- d. Method of Soil Analysis, Part 2, Chemical and Microbiological Properties, Am. Soc. Agron., Madison, WI (1965).
- e. USEPA Contract Laboratory Program, Statement of Work for Inorganic Analysis.
- f. Code of Federal Regulations.

INCRGANICS DATA SUMMARY REPORT 07/14/05

CLIENT: TNUHANFORD F05-023 H3232 LVL LOT #: 0506L853

WORK ORDER: 11343-606-001-9999-00

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
****	*********		********		===========	***
-001	B1D7C7	% Solids	94.9	ł	0.01	1.0
		Chromium VI	0.28	MG/KG	0.21	1.C
		Nitrate Nitrite	5.1	MG/KG	0.21	1.0
		Total Organic Carbon	224	MG/KG	131	1.0
		Oil & Grease Gravimetri	703 u	MG/KG	703	1.0
		Total Inorganic Carbon	100 u	MG/KG	100	1.0

INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/14/05

CLIENT: TNUHANFORD F05-023 H3232 LVL LOT #: 0506L853

WORK ORDER: 11343-606-001-9999-00

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	result	UNITS	LIMIT	FACTOR
	######################################		二二甲基甲甲基苯		BB#==#888	医温度医电影管
BLANK10	051VI043-MB1	Chromium VI	0.20 и	MG/KG	0.20	1.0
BLANK10	05LN3A36-MB1	Nitrate Nitrite	0.20 u	MG/KG	0.20	1.0
BLANK10	05LT2016-MB1	Total Organic Carbon	4.7 u	MG/KG	4.7	1.0
BLANK10	05L0G031-MBI	Oil & Grease Gravimetri	657 u	MG/KG	667	1.0
BLANK10	05LTZA16-MB1	Total Inorganic Carbon	4.7 u	MG/KG	4.7	1.0

INORGANICS ACCURACY REPORT 07/14/05

CLIENT: TNUHANFORD F05-023 H3232 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0506L853

			SPIKED	INITIAL	SPIKED		DILUTION
SAMPLE	SITE ID	ANALYTE	SAMPLE	RESULT	AMOUNT	*RECOV	FACTOR (SPK)
BB 03222			-	*****		*************************************	***=====
-001	BlD7C7	Soluble Chromium VI	4.4	0.28	4.2	96.9	1.G
		Insoluble Chromium VI	1440	0.28	1260	114.8	100
		Nitrate Nitrite	9.6	5.1	5.3	85.9	1.0
		Total Organic Carbon	8030	224	8000	97.6	1.0
BLANK10	05LVI043-MB1	Soluble Chromium VI	3.9	0.20u	4.0	97.6	1.0
		Insoluble Chromium VI	1370	0.20u	1180	116.0	100
BLANK10	05LN3A36-MB1	Nitrate Nitrite	5.4	0.20u	5.0	108.4	1.0
BLANK10	05LTZ016-MB1	Total Organic Carbon	392	4.7 u	400	98.1	1.0
BLANK10	05LOG031-MB1	Oil & Grease Gravimetr	6070	667 u	6680	90.8	1.0

INORGANICS PRECISION REPORT 07/14/05

CLIENT: TNUHANFORD F05-023 H3232 LVL LOT #: 0506L853

WORK ORDER: 11343-606-001-9999-00

			INITIAL			DILUTION
SAMPLE	SITE ID	ANALYTE	result	REPLICATE	RPD	FACTOR (REP)
22E2455			x== = 100 P P	本可 以分配 工工工	*****	二月四日東日の三五天 寺
-001REP	B1D7C7	♣ Solids	94.9	94.7	0.15	1.0
		Chromium VI	0.28	0.32	15.6	1.0
		Nitrate Nitrite	5.1	5.0	2.6	1.0
		Total Organic Carbon	224	67.1 u	200	1.0
		Oil & Grease Gravimetri	7 03 u	703 u	NC	1.0
		Total Inorganic Carbon	100 u	532	200	1.0

Lionville	Laboratory	Use Only
	,	

Custody Transfer Record/Lab Work Request Page__/of_/_

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	Fluor Hanford	Inc.		CHAIN	OF CUSTOD	Y/SAMPLE AI	ALYSIS R	REQUEST		F	05-023-002		PAGE 1	OF 1
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ICE CHEST NO	?03.0	\mathfrak{T}	FIELD LOGBOO HNF-N-336-1	K NU.		COA 119152E510		1) OF SHIPMEN LEXPRESS					
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SE=Sediment T=Tissue V=Vegitation			VOL	UME	120ml.							- ·· -·		
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SAMPLE NO		MATRIX*	SAMPLE DATE	SAMPLE TIME										
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FINAL SAMPLE DISPOSITION	DISPOSAL HET	НОО					D	ISPOSED BY					PATE/TIME	
A-6003-618(03/03)	1	· · · · 												

Lionville Laboratory Incorporated SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: TNU- HANFORD

Purchase Order / Project# /
SAFF / SOW# / Release #: Fo2-023

LvLI Batch #: 15061853

Sample Custodian: Victor Lucasure

	NOTE: EXPL	AIN ALL DIS	CREPANCIES		•
1.	Samples Hand Delivered or Shipped	Carrier	صبح کی	Airbill#	1813 4319
2.	Custody seals on coolers or shipping container intact, signed and dated?	DV es	□ No	□ No Seals	Comments
3.	Outside of coolers or shipping containers are free from damage?	⊡ Yes	□ No		
4.	All expected paperwork received (coc and other client specific information) sealed in plastic bag and easily accessible?	1 Yes	□ No		
5.	Samples received cooled or ambient?	Temp 4./	°C	Cooler# 6	ef-03-022
6.	Custody seals on sample containers intact, signed and dated?	DY es	□ No	□ No Seals	
7.	coc signed and dated?	□ Yes	□ No		
8.	Sample containers are intact?	□ Yés	□ No		
9.	All samples on coc received? All samples received on coc?	Dy es	□ No		
10.	All sample label information matches coc?	Dies	□ No		
11.	Samples properly preserved?	O es	□ No		
12.	Samples received within hold times? Short holds taken to wet lab?	DAR.	□ No		
13.	VOA, TOC, TOX free of headspace?	□ Yes	□ No	DAVA	
14.	QC stickers placed on bottles designated by client?	DY's	□ No	□ N/A	
15.	Shipment meets LvLI Sample Acceptance Policy? (Identify all bottles not within policy. See reverse side for policy)	BYS	□ No		
16.	Project Manager contacted concerning discrepancies? name/date (or samples outside criteria)	□ Yes	□No	Discrepancies	





Geotechnical Laboratory PO Box 4339 1570 Bear Creek Road Oak Ridge TN 37830 (865) 482-6497

CERTIFICATE OF ANALYSIS

Stephen Trent Fluor Hanford, Inc. 825 Jadwin Avenue Richland, Washington 99352 August 16, 2005

This is the Certificate of Analysis for the following samples:

Shaw Project ID:
Shaw Project Number:
Client Sample Data Group:
Date Received by Lab:
Number of Samples:
Sample Type:

Eberline - Hanford 100846.61000000 H3232 June 30, 2005 One (1) Soil



I. Introduction/Case Narrative

One soil sample was received by the Shaw Geotechnical Laboratory on June 30, 2005. The sample was submitted for determination of moisture content, bulk density, sieve analysis, specific gravity, and calcium carbonate content. The sample number received was B1D7C7

Please see Appendix A, Sample Number Cross Reference List; Appendix B, Analysis Results; and Appendix C, Chain-of-Custody/Sample Receipt Records.

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Reviewed and Approved:

Ralph Cole

Laboratory Manager, Geotechnical Services

Page 2 of 11
August 16, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.61000000
SDG No. H3232

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

II. Analytical Results/Methodology

REFERENCES: United States Army Corps of Engineers (USACE), Engineer Manual 1110-2-1906, Laboratory Soils Testing, appendix II, 1970; United States Environmental Protection Agency, SW846, Test Methods for Examining Solid Waste, Physical/Chemical Methods, 3rd ed., Nov 1986 (EPA SW-846). Annual Book of ASTM Standards, Section 4, Construction, Volume 04.08, Soil and Rock (I), and Volume 04.09, Soil and Rock (II), 2005. Shaw Environmental and infrastructure, Standard Operating Procedures.

Moisture Content of Soil and Rock	ASTM D 2216
Bulk Density of Soils	EM 1110-2-1906
Particle-size Analysis of Soils	
Specific Gravity of Soil	
Calcium Carbonate Content	

III. Quality Control

Quality control checks such as duplicates and spikes (QC samples), are not normally applicable to geotechnical testing. This is due largely to the inability of obtaining samples with known characteristics, the heterogenous nature of the samples, and quality control procedures built-in to the analytical method.

QC measures to ensure accuracy and precision of test results include the following:

- 100% verification of all numerical results raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified. Most data calculations are performed by computer programs.
- Data validation through test reasonableness summaries of all test results for individual reports are reviewed to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.
- Quality control procedures are built into most standardized geotechnical procedures. For example, liquid limit and plastic limit analyses call for re-analyses and specify acceptance criteria.
- Routine instrument calibration Instruments, gauges and equipment used in testing are calibrated on a routine basis. All instrument calibration follows ASTM or manufacturer guidelines.

Page 3 of 11 August 16, 2005 Stephen Trent Fluor Hanford, Inc. Shaw Project Name: Eberline Hanford Shaw Project No. 100846.61000000 SDG No. H3232

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

- Maintenance of all past calibration records calibration records and certification documents
 of all instruments, gauges and equipment are updated routinely and maintained in the
 Quality Control Coordinators Quality/Operations files.
- Certified and trained personnel all technicians are trained in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented by Shaw.
- Quantitative analyses frequently used in geotechnical/physical testing programs do not use
 QC tools common to wet chemistry or radiochemistry laboratories. Measures not employed
 in the analysis of samples reported in this report include: laboratory control samples (LCS),
 blanks, matrix spikes (MS), duplicate analyses, dilutions, digestions, correction factors,
 surrogate sample analyses, detection limit determinations, control charts, and/or tentatively
 identified compounds (TICs).

IV. Data Qualification

None.

Appendix A
Sample Cross-Reference List

Page 4 of 11
August 16, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.61000000
SDG No. H3232

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

SAMPLE NUMBER CROSS-REFERENCE LIST

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX
BC0591	.,B1D7C7	Soil

Appendix B Sample Test Results Page 5 of 11 August 16, 2005 Stephen Trent Fluor Hanford, Inc. Shaw Project Name: Eberline Hanford Shaw Project No. 100846.61000000 SDG No. H3232

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

MOISTURE CONTENT

PROJECT NAME

Eberline Hanford

PROJECT NUMBER 100846.61000000

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MOISTURE, % ASTM D 2216	MOISTURE,% SW846	SOLIDS, % SW846
BC0591	B1D7C7	6.1	5.8	94.2
		 		L
				
				
 				
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ASTM D 2216 results are based on dry sample weight. SW846 results are based on wet sample weight. Solids content is determined by subtracting the SW846 moisture (%) from 100. Page 6 of 11 August 16, 2005 Stephen Trent Fluor Hanford, Inc.

Shaw Project Name: Eberline Hanford Shaw Project No. 100846.61000000

SDG No. H3232

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

BULK DENSITY/DRY DENSITY ASTM C 2937

PROJECT NAME:

PROJECT NUMBER:

Eberline Hanford

100846.61000000

LAB SAMPLE	CLIENT	AVERAGE LENGTH,	AVERAGE DIAMETER,	WET WEIGHT,	MOISTURE CONTENT,	BULK DENSITY,	DRY DENSITY,
NUMBER	NUMBER	inches	inches'	grams	%	pcf	pcf
BC0591	B1D7C7	6.0095	3.8698	2235.85	6.0	120.5	113.7
						 	
 			†				
		 	 				
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Moisture content calculated by ASTM D 2216 based on sample dry weight.

Bulk density is the weight of wet sample divided by the volume of the wet sample (as-received).

Dry density is the weight of the dry sample solids divided by the volume of the original sample.

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August 16, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.61000000
SDG No. H3232

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

PARTICLE-SIZE DISTRIBUTION ASTM D 422

Project Name Eberline Hanford

Field Sample No. B1D7C7

Project No.

100846.61000000

Lab Sample No.

BC0591

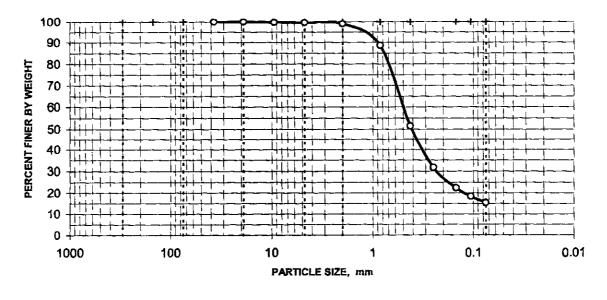
Moisture Content = 6.0% based on dry sample weight

SIEVE ANALYSIS

	Sieve	Diameter	Percent
С	No.	mm	Finer
0	3"	75.000	100.0%
Ā	1.5"	37.500	100.0%
R	0.75"	19.000	100.0%
S	0.375"	9.500	99.8%
_	#4	4.750	99.7%
	#10	2.000	99.0%

	Sieve	Diameter	Percent
	No.	mm	Finer
_F	#20	0.850	88.6%
i	#40	0.425	51.5%
N	#60	0.250	31.6%
E	#100	0.149	22.5%
	#140	0.106	18.4%
	#200	0.075	15.4%

DISTRIBUTION CURVE



0.3% Gravel

84.3% Sand

15.4% Silt/Clay

Page 8 of 11 August 16, 2005 Stephen Trent Fluor Hanford, Inc. Shaw Project Name: Eberline Hanford Shaw Project No. 100846.61000000 SDG No. H3232

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

SPECIFIC GRAVITY ASTM D 854

PROJECT NAME: Eberline Hanford

PROJECT NUMBER: 100846.61000000

LAB SAMPLE NO.	CLIENT SAMPLE NO.	SPECIFIC GRAVITY
BC0591	B1D7C7	2.8549

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August 16, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.61000000

SDG No. H3232

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

Carbonate Content of Soils ASTM D 4373

PROJECT NAME: Eberline Hanford

PROJECT NUMBER: 100846.61000000

LAB SAMPLE NO.	CLIENT SAMPLE NO.	CO3. %
BC0591	B1D7C7	0

Appendix C Chain-of-Custody and Request-for-Analysis Records

BC 0281

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SCAD: 00\58\02 DOE: 08\T5\02

MORK ID: SYE# LO2-053 SDG H3535

06/28/05 13:45:51

CHANCE OF CUSTODY ORD # R5-06-230

PAGE 1

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST						F05-023-006		PAGE 1 OF 1	
COLLECTOR Pope/Pfister/Mokler/Weis/Tyra / W / S &:	COMPANY CONTACT TRENT, SJ	PROJECT O	PROJECT COORDINATOR TRENT, SJ		8N	DATA TURNAROUNI	Φ			
SAMPLING LOCATION 216-A-8, 1-2	PROJECT DESIGNATION 216-A-8 Crib Characterization Bore	SAF NO. F05-023				ļ				
ICE CHEST NO PP-03-024	FIELD LOGBOOK NO. HNF-N-386-1		COA 119152ES10		METHOD OF SHIPMENT FEDERAL EXPRESS					
SHIPPED TO Shaw Group	OFFSITE PROPERTY NO	EN	E(1)3221		BILL OF LADING/AIR PHIL NO.					
MATRIX* POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	None	None			a R				
DL-Drum Liquids DS-Drum RAN +U +O	TYPE OF CONTAINER	Split Spoon Liner	Moisture Resistant Cont							
DL-Drum Liquids DS-Drum Solds L-Liquid D-Oil S-SOI S-S	NO. OF CONTAINER(S)	1	i		 					
SE=Sediment T=Tissue V=Vegitation W=Water	VOLUME	1500g	200g							
WI=Wipe X=Other SPECIAL HANDLING AND/OR STORAGE	SAMPLE ANALYSIS	SEE MEM (1) IN SPECIAL INSTRUCTIONS	Contant - D2216;							
SDG# H3232		28909								
SAMPLE NO. MATRIX*	SAMPLE DATE SAMPLE TIME	L	, ,				· · · · · · · · · · · · · · · · · · ·			
B1D7C7 SOIL	6/13/5-0935				ВС	0591				
			 							
CHAIN OF POSSESSION	SIGN/ PRINT NAMES	<u> </u>		l s	PECIAL INSTR	UCTIONS				
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RELINQUISHED BY/REMOVED FROM DATE/THEE RELINQUISHED BY/REMOVED FROM DATE/THEE DATE/THEE	RECEIVED BY/STORED IN	06/26	DE 16 5 9:30		TO SHAW LAB					
RELINQUISHED BY/REMOVED FROM 6/29/05 16:00	RECEIVED BYSTORED IN	429	OS DATE/TE	ME				·		
LABORATORY SECTION RECEIVED BY DIFFULLEY				SA.		nas tee	ct (a /30/c		
FINAL SAMPLE DISPOSAL METHOD					ISPOSED BY			- D.	ATE/TIME	